

THE NEOTROPICAL GENUS TACHIA (GENTIANACEAE)

BASSETT MAGUIRE AND RICHARD E. WEAVER, JR.

THE GENUS *Tachia* Aublet, consisting of nine species as here recognized, is characteristic of the rain forest lowlands and midlands of the Hylaea. It is unusual among the genera of the Gentianaceae in that characters separating it from others are well marked and constant.

All species are semiherbaceous or soft-stemmed perennials that usually develop a single stem. Sometimes they assume small treelike aspects. The essentially sessile flowers, arising in succession from a "cushion" or broad short shoot in the axils of the leaves, and the ovary mounted on a short, persistent, fibrous peg are unique in the family. Some species seem to be imperfectly delineated, possibly because of the scarcity of collected material. Such taxa here recognized may in the future, in the light of more adequate observation, require re-evaluation.

MORPHOLOGY — ANATOMY

Habit. As noted above, all members of the genus are perennial with subligneous, commonly subvirgate and little branched, quite characteristically greenish or bright yellow stems. This yellow coloration, present also in the calyces and often in the corollas, makes the plants conspicuous in their forest habitats.

Leaves. The leaves are entire and petiolate. Species of section TACHIA develop penniveined, coriaceous or chartaceous, seldom membranaceous blades. Those of section SCHOMBURGKIANA are invariably tri- or quintuple-veined and somewhat membranaceous.

Flowers. The calyx provides excellent and consistent criteria for the distinction of species in its degree of division, i.e., in the relative length of tube and lobes. The development or absence of calyx keels is consistent. In *Tachia schomburgkiana* the keel becomes a prominent wing which is extended and oriented beyond and at right angles to the plane of the calyx tube as a prominent lobe.

The corolla is tubular, often somewhat ventricose or expanded, with lobes commonly considerably shorter than the tube. In *Tachia parviflora* the tubes and lobes are essentially equal in length.

The five stamens are commonly exerted; their filiform filaments are adnate to the corolla tube, the point of attachment being a dependable character in the separation of species. Anthers are introrse, oblong, caudate and basifixed, with connective not produced, although the region of transition may sometimes be at an angle with the plane of the anther. Dehiscence is longitudinal and ventral.

The gynoecium is surmounted on a short but obvious glandular-lobed

gynobase, and is 2-carpellary. The ovary is unilocular, but the lateral sutures are deeply intruded, and placentation, therefore, is sometimes sub-pseudoaxillary. Styles exceed the ovary but are sometimes deciduous. The stigma is bilamellate.

Seeds are small, usually coarsely papillate, subprismatic, and commonly 0.4–0.6 mm. in longest axis.

Pollen. The pollen grains are sphaeroidal or rarely ellipsoidal, tricolporate, and usually 30–40 μm . along the longest axis. The exine is typically reticulate, but the width of the lumina, and therefore the coarseness of the reticulum, vary enormously from species to species. In *Tachia guianensis*, *T. grandifolia*, and *T. schomburgkiana* the lumina are large and the reticulum is relatively fine. In *T. parviflora*, however, the lumina are greatly reduced and the exine appears merely punctate. Finally, in *T. occidentalis* the exine appears completely smooth except for the presence of a few, irregularly spaced globules.

Unfortunately, as Nilsson (1967, 1968, 1970) has found to be the case with many Gentianaceae, the variation in pollen grain morphology is not correlated with gross morphological variation. Therefore, although it does provide specific characters, pollen morphology is of little phyletic significance in this genus.

PHYLOGENY AND GEOGRAPHY

Distribution patterns of the species of *Tachia* show a checkerboard configuration (MAP 1). From the material now available, no two species seem to be sympatric except *T. occidentalis* and *T. parviflora*, and these in only a small part of their assumed overlying ranges. For six species the ranges are, comparatively, "eastern" and local. Three species are "western": the range of *T. occidentalis* is the largest, albeit somewhat disjunct; that of *T. loretensis* is local; and that of *T. parviflora* is limited, but greatly disjunct.

There seems to be no significant geographic or ecologic correlation with presumptive systematic relationships within the genus. Indeed, if the members of section SCHOMBURGKIANA, so delimited largely because of the plinnerved leaves, are considered the more primitive group, then its members have achieved the more extended distribution, with the distinctive *Tachia schomburgkiana* occupying a compact range on the eastern periphery of the Roraima sandstone sediments of Guyana and contiguous Venezuela, and the disjunct *T. parviflora* a range of eastern middle altitudes in central Peru and of similar habitat in Amazonian Bolivia. The indefinite locality for the original collection of *T. gracilis*, and the scanty collections from the pediments of Cerro Marahuaca of Roraima sediments in Territorio Amazonas of Venezuela, offer remote intermediate geographic connection.

Distribution of the six members of section TACHIA, characterized by penniveined leaves, similarly does not present any persuasive indication of progressive distribution as related to morphologic modification.

Tachia would fit into the Tachiinae of the Gentianeae as ordered by



MAP 1. Distribution of species of *Tachia*.

Gilg (1895) and thus be aligned in our area with *Macrocarpaea* (Griseb.) Gilg and the later described *Chorisepalum* Gleason & Wodehouse, which is endemic to the Guayana Highland. Palynologically, *Tachia* is similar to these two genera.

ACKNOWLEDGMENTS

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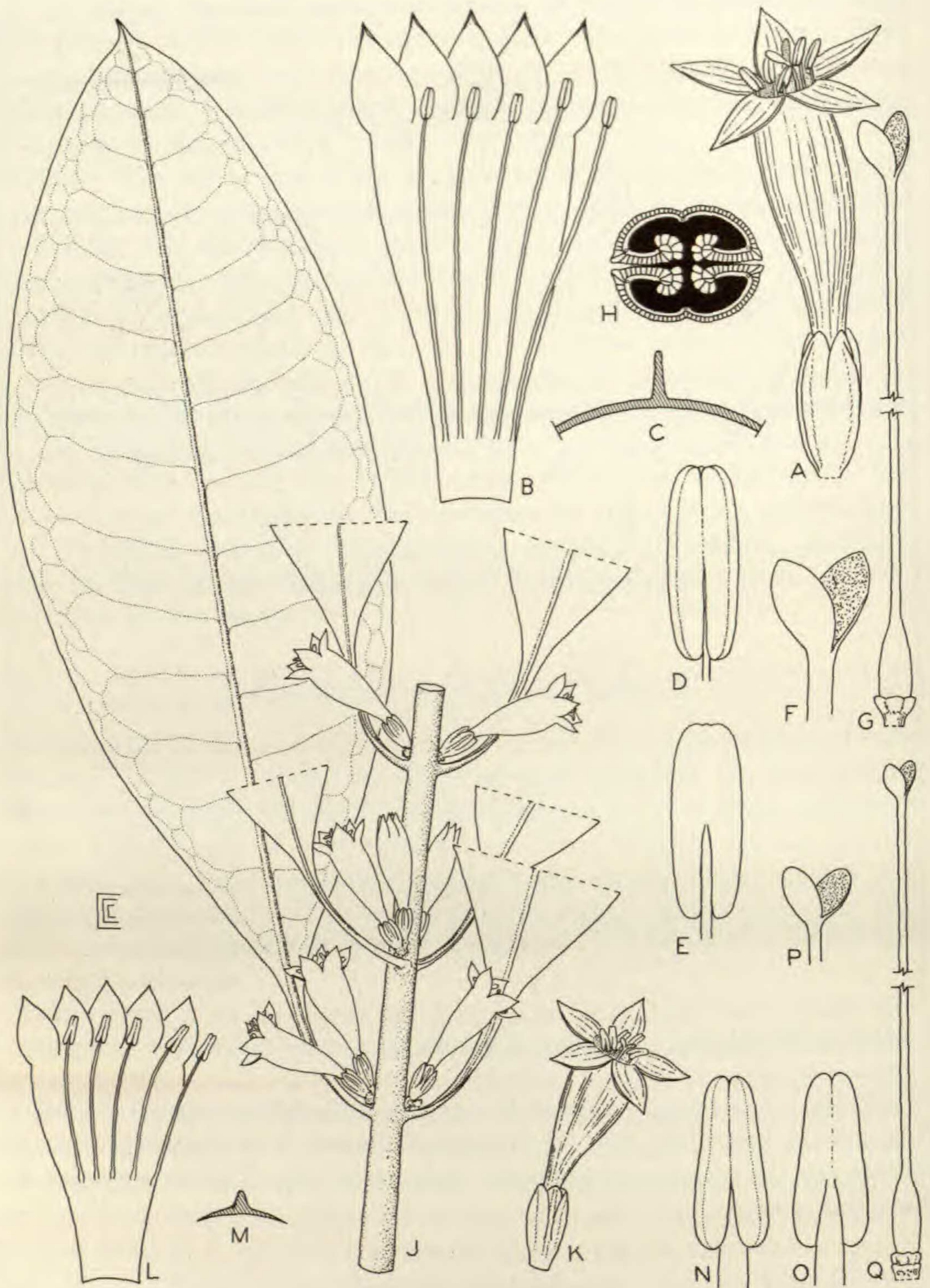


FIGURE 1. A-H, *Tachia occidentalis*. A, flower, $\times 1$; B, opened corolla, $\times 1$; C, sepal, cross-section diagram, $\times 6$; D, anther, ventral view, $\times 6$; E, anther, dorsal view, $\times 6$; F, stigma, *Schunke-Vigo 1047*, $\times 3$; G, pistil, *Schunke-Vigo 1047*, $\times 2$; H, capsule, cross-section diagram, *Wolfe 12229*. J-Q, *Tachia grandifolia*, all from *Silva & Brazão 60842*. J, habit, $\times 1/2$; K, flower, $\times 1$; L, opened flower, $\times 1$; M, sepal, cross-section, $\times 6$; N, anther, ventral view, $\times 6$; O, anther, dorsal view, $\times 6$; P, stigma, $\times 3$; Q, pistil, $\times 2$.

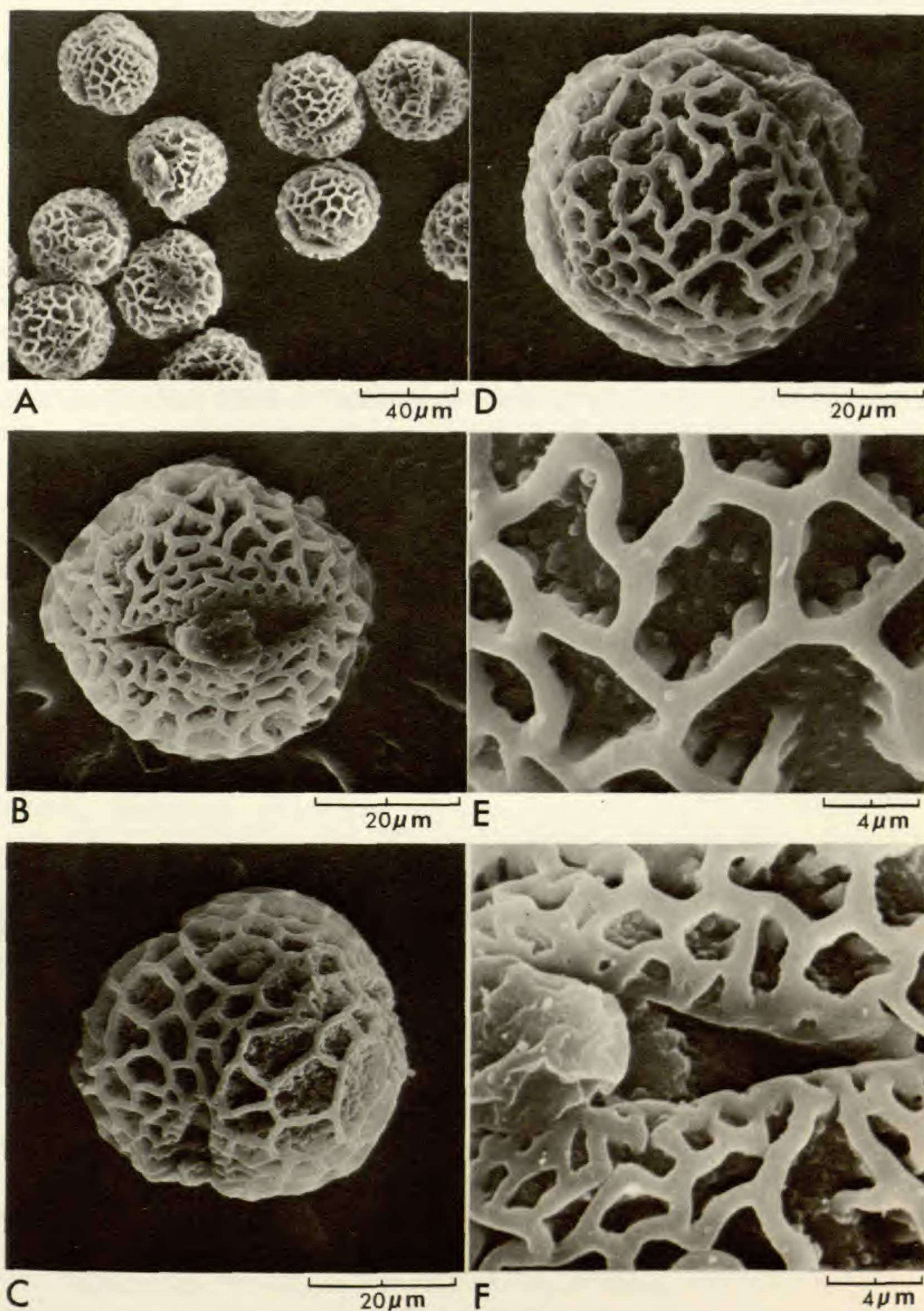


FIGURE 2. *Tachia grandifolia*, Maguire et al. 37496, SEM micrographs. Pollen grains sphaeroidal, 3-colporate, exine strongly reticulate. A, general field, $\times 500$; B, sulcus and pore, equatorial view, $\times 1500$; C, polar view, $\times 1500$; D, intersulci, equatorial view, $\times 1500$; E, reticulum, $\times 5000$; F, portion of pore and sulcus, $\times 5000$.

tuto Agronomico do Norte, Belem; the Jardim Botânico, Rio de Janeiro; and others.

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SYSTEMATIC TREATMENT

Tachia Aublet, Pl. Guiane 1: 75. 1775.

Flowers 5-merous, solitary, rarely binary, sessile or subsessile on an axillary "cushion" or broad short shoot, thereupon often appearing seasonally and successively; calyx tubular, sometimes 5-carinate or alate, the lobes exceeding the tube or subequal, the interior at the base beset with a 5-lobed ring of upwardly directed squamellae; corolla infundibuliform, slightly ventricose, rarely short salverform, the tube much exceeding the apiculate lobes (except in *Tachia parviflora*); stamens 5, exserted, the filaments attached below the middle of the corolla tube or at the juncture of the tube and lobes, the anthers introrse, linear-oblong, caudate, basifixed, 4-celled; pollen grains simple, 3-colporate, sphaeroidal or rarely ellipsoidal, 33–45 μm . in diameter, the polar axis somewhat the longer, the exine clearly and sharply reticulate (psilate and globulate in *T. parviflora*), or punctate; the ovary borne on a short, persistent, glandular gynobase, 1-locular, the placentae deeply intruded, shortly inflexed, the ovules numerous; styles marcescent, exceeding the corolla; the stigmas strongly bilamellate; seeds numerous, small, prismatic, tuberculate.

Subligneous or soft-stemmed shrubby perennials, commonly simple-stemmed, often of small treelike aspect.

TYPE: *Tachia guianensis* Aublet.

This small genus may be divided into two groups, each reflecting close infrarelationships, one with pinnately veined leaves (6 species) and the other with quintuple-veined leaves (3 species). The most sharply distinctive species is *Tachia schomburgkiana*, with thin pli-veined leaves and a prominently winged calyx.

I. Section TACHIA. Blades of the leaves pinnately nerved.

Tachia guianensis (type species), *T. grandifolia*, *T. occidentalis*, *T. smithii*, *T. lorentensis*, and *T. grandiflora*.

II. Section Schomburgkiana Maguire & Weaver, sect. nov. Laminae foliorum quintuplinervatae.

Tachia schomburgkiana (type species), *T. gracilis*, *T. parviflora*.

KEY TO THE SPECIES OF TACHIA

A. Leaves inconspicuously penninerved (sect. TACHIA).

B. Calyx divided to below the middle; leaf blades thick and somewhat coriaceous, to 28 cm. long; corolla 4 cm. long or less; pollen grains sphaeroidal, exine reticulate. 1. *Tachia grandifolia*.

- B. Calyx divided to the middle or above; leaf blades chartaceous, not more than 20 cm. long; corolla 5 cm. long or longer.
- C. Corolla lobes coiled laterally at anthesis; calyx (2/5-) half as long as the corolla tube; pollen grains ellipsoidal, exine reticulate. 2. *Tachia guianensis*.
- C. Corolla lobes plane at anthesis; calyx a third as long as the corolla tube, rarely nearly half as long.
- D. Calyx narrowly 5-alate, divided 1/3 of its length; pollen grains subsphaeroidal, exine smooth, sparingly beset with globules. 3. *Tachia occidentalis*.
- D. Calyx not alate, at most 5-carinate, divided to ca. the middle.
- E. Corolla narrowly tubular-funnelform, the tube not expanded above; filaments conspicuously recurved or hook-shaped at the apex. 4. *Tachia smithii*.
- E. Corolla funnelform, the tube conspicuously expanded above; filaments straight or upcurved at the very tip.
- F. Corolla less than 6 cm. long; lateral veins of the leaves forming an acute angle (45°-60°) with the midvein and arching toward the tip of the leaf; pollen grains sphaeroidal, exine reticulate. 5. *Tachia lorentensis*.
- F. Corolla 7 cm. long or longer; lateral veins of the leaves forming nearly a right angle with the midvein and spreading toward the margins of the leaf. 6. *Tachia grandiflora*.
- A. Leaves distinctly 3-5-nerved (sect. SCHOMBURGKIANA).
- G. Corolla more than 5 cm. long, the tube conspicuously surpassing the calyx.
- H. Calyx strongly 5-alate, 2.5-4.0 cm. long, the lobes 1.1-2.8 cm. long; pollen grains sphaeroidal, exine reticulate. 7. *Tachia schomburgkiana*.
- H. Calyx not alate, less than 2 cm. long, the lobes less than 1 cm. long. 8. *Tachia gracilis*.
- G. Corolla less than 2.5 cm. long, the tube barely surpassing the calyx; pollen grains sphaeroidal, non-reticulate, smooth, minutely punctate. 9. *Tachia parviflora*.

1. *Tachia grandifolia* Maguire & Weaver, sp. nov. TYPE: Brazil. Amazonas: in catanga forest between Missão Salesiana and Serra Pirapucú [Neblina], Rio Maturacá, Rio Cauaburi-Negro, 400-800 m., *Silva & Brazão 60824* (holotype, NY; isotypes, IAN, RB, US, K).

FIGURES 1, J-Q; 2; 3.

Herbae perennes saepe basibus lignosis; caulibus vulgo 2-4 m. altis crassis viridibus ca. 12-15 mm. diametro glabris, internodiis vulgo 12-14 cm. longis; foliis oppositis, petiolis 2-4 cm. longis triangularibus, laminis ovalibus vel oblongo-ovalibus vel aliquando late oblanceolatis 22-28 cm. longis 10-14 cm. latis firme subsucculentis, basibus acutis, apicibus obtusis, abrupte apiculatis vel abrupte brevi-acuminatis, costis prominentibus, inconspicue pinnivenatis; floribus axillaribus vulgo solitariis aliquando pluribus subsessilibus; calyce 10-12 mm. longo cylindrico non-alato valde 5-carinato glabro in sicco valde 5-angulari, tubo crasso intus glabro, lobis 5 oblongis obtusis 5-6 mm. longis cucullatis anguste scariomarginatis;

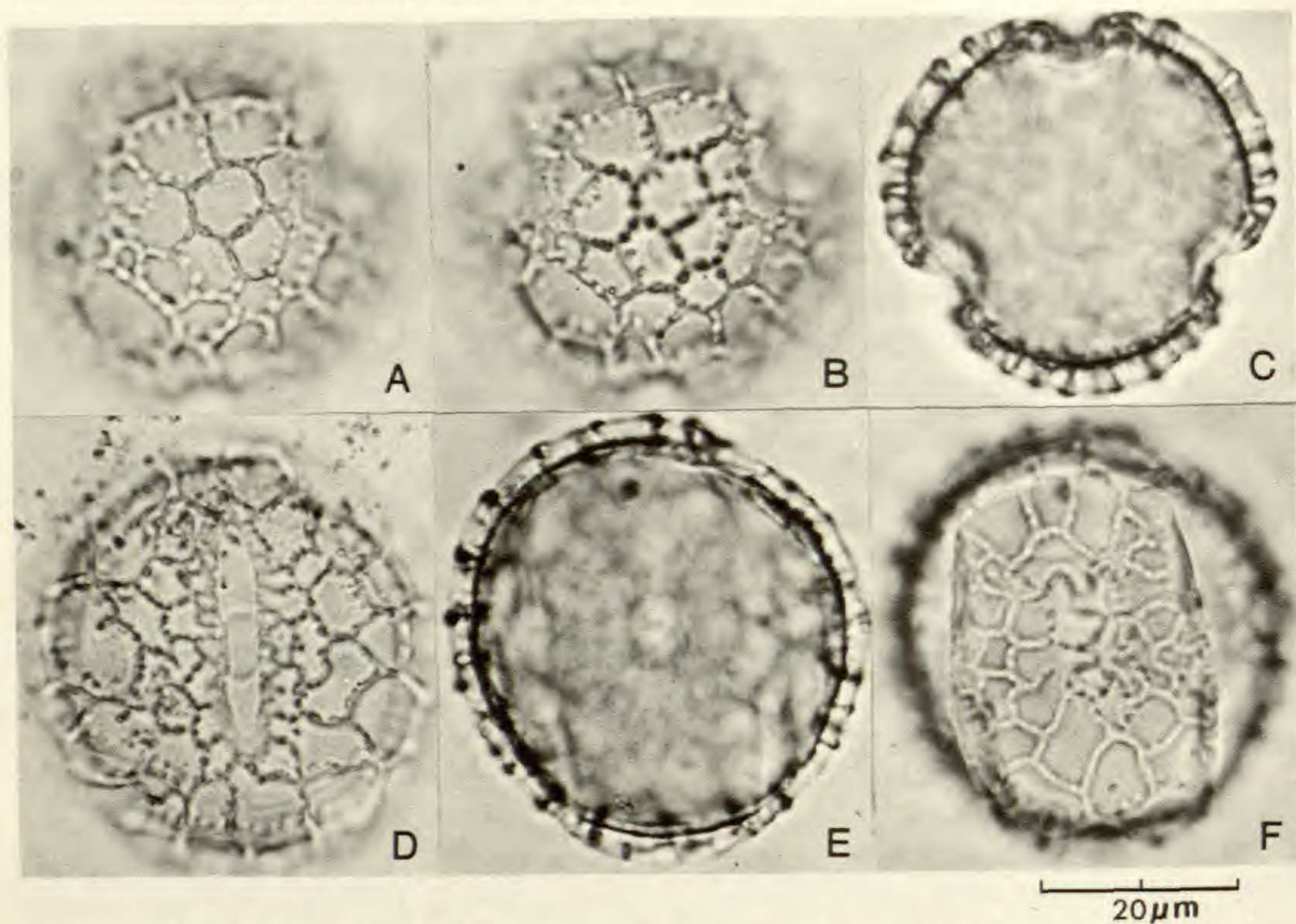


FIGURE 3. *Tachia grandifolia*, Maguire et al. 37496. Light microscope micrographs, $\times 1500$. A–C, polar views. A, upper focus level; B, lower focus level; C, median focus level. D–F, equatorial views. D, upper focus level, note sulcus and pore; E, median focus level; F, lower focus level, note laterally placed sulci.

corollis infundibuliformibus ventricosus 4.5–5.0 cm. longis, tubo 1.8–2.0 cm. longo, limbo 2.8–3.0 cm. longo, lobis 8–9 mm. longis acutiusculis; staminibus 5, filamentis 6–8 mm. longis, juncto tubo et limbo affixis, antheris oblongis ca. 3 mm. longis 1 mm. caudatis; pollinibus sphaeroideis 3-colporatis 42–45 μm . diametro sporodermate reticulato muris tenuibus; ovario uniloculari bivalvulo valvulis breviter inflexis, placentationibus valde inflexis subparietalibus, ovulis numerosis, gynobase glandulosa 2–3 mm. alta, stylis 26–28 mm. longis, stigmatibus bilamellatis ovatis obtusis ca. 2 mm. longis; capsulis 15–17 mm. longis; seminibus brunneis prismaticis echinulatis 0.4–0.5 mm. longis.

DISTRIBUTION. Low-altitude catinga or sometimes flooded forests or adjacent terra firma, approaches to Cerro de la Neblina.

SPECIMENS EXAMINED. Venezuela. Territorio Amazonas: Río Yatua, Río Pacimoni, occasional at 110 m., Piedra Araucaua, Maguire, Wurdack & Bunting 37477 (NY, 2 sheets, VEN, US); Piedra Tururumeri, 110 m., Maguire, Wurdack, & Bunting 37496 (NY, 2 sheets, VEN, US); woodland at base of Cerro Araucaua, 125–250 m., Steyermark & Bunting 102534 (US). Brazil. Amazonas: Cucuhy, Rio Negro, 120 m., Holt & Gehriger 355 (US).

1a. *Tachia grandifolia* Maguire & Weaver var. *orientalis* Maguire & Weaver var. nov. TYPE: Brazil. Territorio Roraima: vicinity of

Posto Surucucus Mission, forest on terra firme, Serra dos Surucucus, $2^{\circ} 42-47'N$, $63^{\circ} 33-36'W$, *Prance et al.* 10084 (holotype, NY; isotypes, F, GH, US).

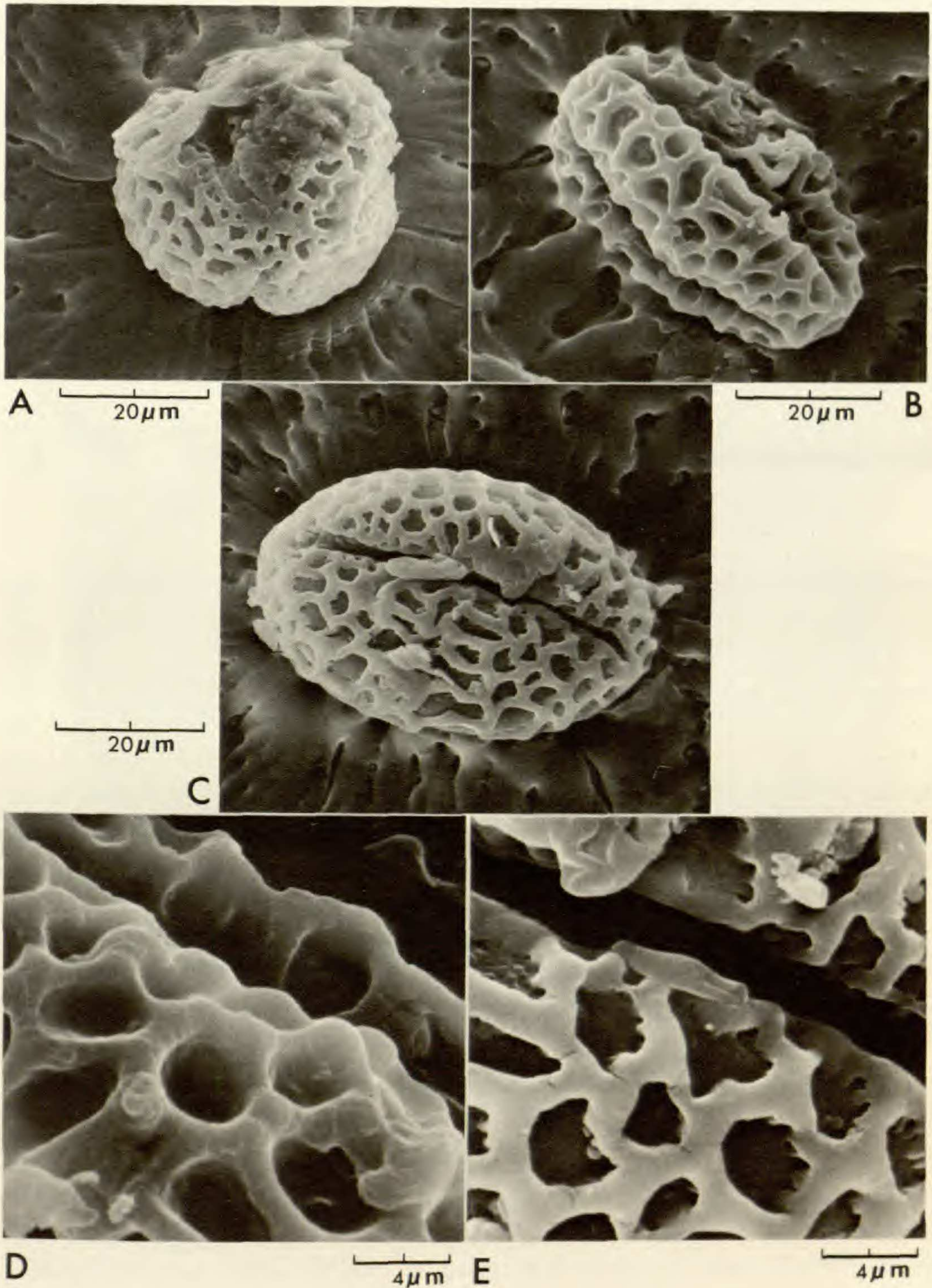


FIGURE 4. *Tachia guianensis*, *Maguire* 24611. Pollen grains ellipsoid, 3-colporate, strongly reticulate. SEM micrographs. A, polar view, $\times 1500$; B, equatorial intersulci view, $\times 1500$; C, equatorial view, sulcus, $\times 1500$; D, reticulum, $\times 5000$; E, reticulum, sulcus, $\times 5000$.

Varietati *grandifoliae* similis sed foliis parvioribus, petiolis tenuibus, 12–26 mm. longis, laminis elliptico-acuminatis, minus coriaceis, vulgo 10–15 cm. longis, frequenter acuminatis.

DISTRIBUTION. Treelet of median altitudes in Roraima Formation forests, drainages of the Uraricoera, Brazil, and the Alto Paragua and Alto Caroní, Venezuela.

SPECIMENS EXAMINED. Brazil. Território Roraima: 4–6 km. south of Auaris, 800 m. 4°3'N, 64°22'W, *Prance et al.* 9823 (F, GH, NY, US); in upland forest

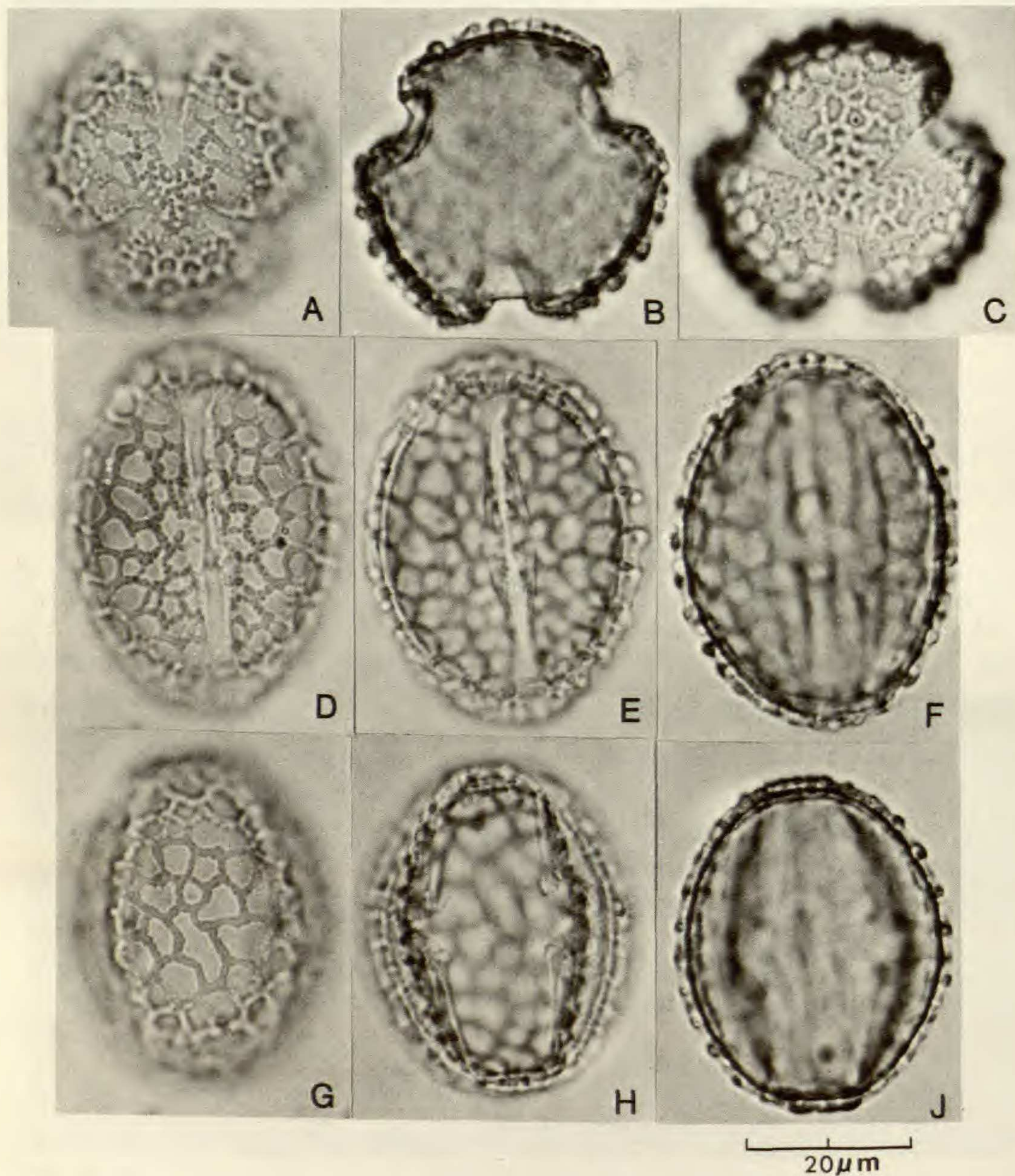


FIGURE 5. *Tachia guianensis*, *Maguire 24611*. Light microscope micrographs, $\times 1500$. A–C, polar views. A, upper focus level; B, median focus level; C, lower focus level. D–F, equatorial views at successive focal levels, grain oriented with sulcus uppermost. G, H, & J, equatorial views at successive focal levels, grain oriented with intersulci area uppermost.

at 1800 m. alt., plateau of Serra dos Surucucus 2°42–47'N, 63°33–36'W, *Prance et al. 9962* (F, INPA, NY, US). Venezuela. Bolívar: exposed rocky slopes of quebrada on southwestern-facing portion of Chimantá-tepuí (Torono-tepuí), 1410 m., *Steyermark 75407* (F, NY, 2 sheets); at base of sandstone bluff, Sierra Ichún, tributary of Río Paragua, 500–625 m., *Steyermark 90420* (NY, US).

The variety *orientalis* is obviously a smaller-leaved variant of *Tachia grandifolia*, but, as the name indicates, it is the more eastern segregate. The form and structure of the scanty and ill-preserved flowers and fruit of both varieties obviously demonstrate close consanguinity, but vegetatively var. *orientalis* is readily distinguishable by its smaller, thinner, and acuminate leaves.

Specimens of var. *orientalis* came to our attention after the completion of the main study, and accordingly its description and citations were later inserted into the typescript. The description of *Tachia grandifolia* was drawn wholly from specimens of var. *grandifolia*.

2. *Tachia guianensis* Aublet, Pl. Guiane 1: 75. t. 29. 1775. TYPE: an Aublet specimen, presumably of French Guiana (P) (IDC 6213.11: I 7). FIGURES 4, 5.

Shrubs or small trees to 4 m. tall; branches subterete, yellow; leaves thin-membranaceous, elliptic (sometimes broadly so) to oblong-elliptic, caudate, cuneate to somewhat rounded at the base, 8.8–19.0 cm. long, and 3.4–9.0 cm. broad, the petiole 5–21 mm. long; calyx exalate, 2.7–3.5 cm. long, (2/5–)1/2 the length of the corolla tube, 2–3 times as long as the petioles, divided ca. 1/3 of its length (or less) into lanceolate, acute or acuminate, erosulate lobes; corolla yellow, narrowly tubular-funnelform, 6.0–7.7 cm. long, the lobes spreading, coiled laterally at anthesis, oblong-lanceolate, abruptly acuminate, 11–16 mm. long and 4–7 mm. broad, 1/4 as long as the tube; stamens inserted in the lower third of the corolla tube, well below the apex of the calyx; filaments straight or slightly upturned at the apex, 4.0–5.2 cm. long, conspicuously surpassing the corolla tube, the anthers oblong, ca. 3 mm. long; pollen grains sphaeroidal, exine prominently reticulate; style 5.0–5.8 cm. long, finally surpassing the corolla lobes, stigma lobes spatulate to suborbicular, 2–3 mm. long; capsule fusiform, to 4 cm. long, projecting from the persistent calyx.

DISTRIBUTION. Small trees or shrubs with subherbaceous stems, commonly at low or middle altitudes in rain forests of the Guianas.

SPECIMENS EXAMINED. Guyana. Kalakoon, Mazaruni River, *Jenman 2406* (NY); dense upland forest, Tumatumari, *Gleason 56* (GH, NY, US); Tacoubea Creek, Kurupung River, *Altson 316* (NY); 400 ft. ca. 83 miles, Bartica-Potaro Road, *Tutin 303* (US); near Makreba Falls, Kurupung River, upper Mazaruni region, *Pinkus 291* (GH, NY, US); wallaba forest near 14th milepost, Bartica-Potaro Road, *Sandwith 1111* (F, NY); Kaieteur Savannas, *Maguire & Fanshawe 23382* (K, NY, US); forest slope, Mount Ayanganna, 1000–1500 m.; *Maguire, Bagshaw, & Maguire 40599* (K, NY); frequent in mixed evergreen forest on laterite, below

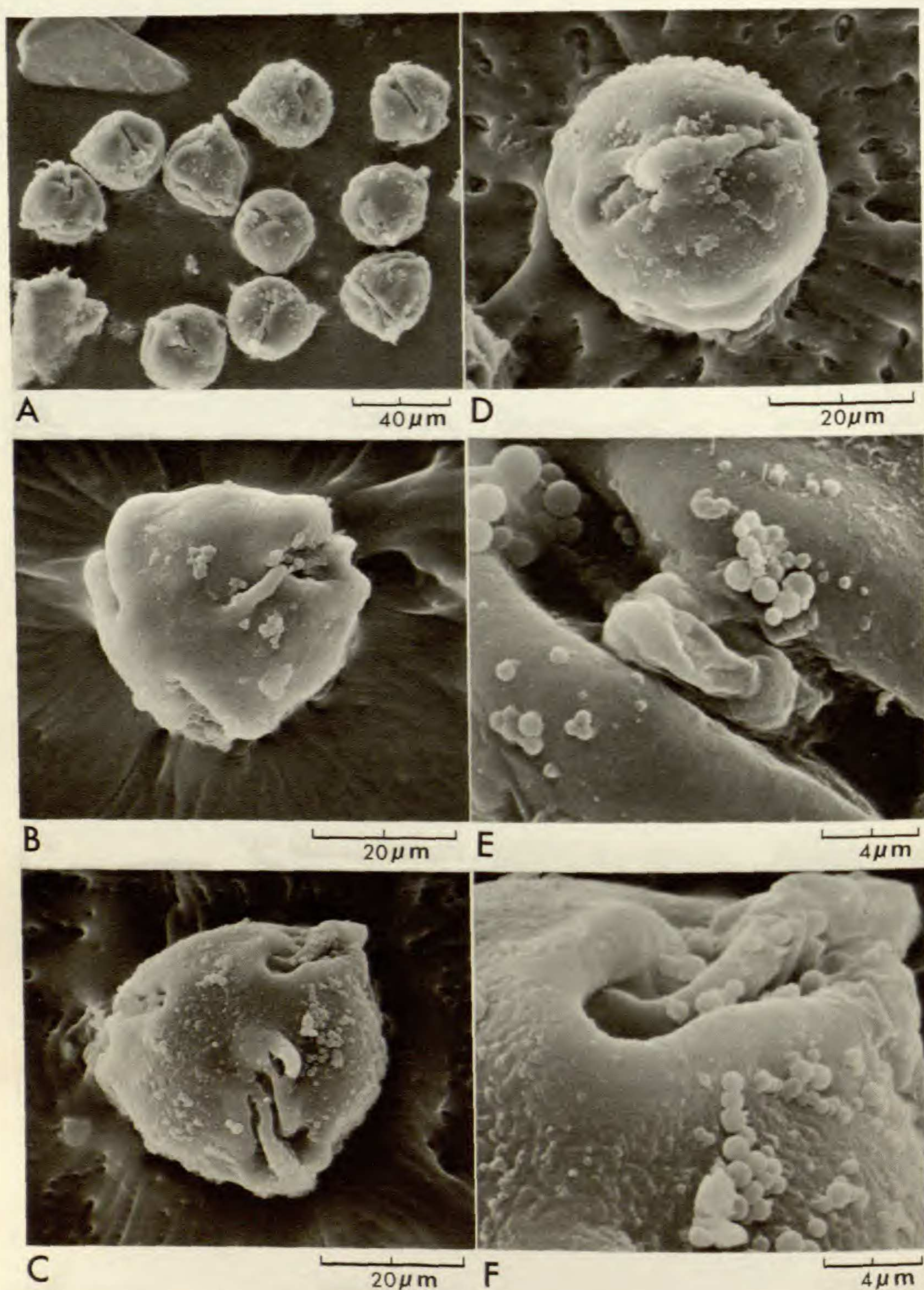


FIGURE 6. *Tachia occidentalis*. SEM micrographs. Pollen grain sphaeroidal-triangular, 3-colporate, exine finely subverrucose, sublaevate. A, general field, *Schultes 12476*, $\times 500$; B, polar view, *Killip & Smith 26163*, $\times 1500$; C, polar view, *Schultes 12476*, $\times 1500$; D, equatorial view, *Schultes 12476*, $\times 1500$; E, pore and sulcus, *Killip & Smith 26163*, $\times 5000$; F, portion of polar view, *Schultes 12476*, $\times 5000$, note heavily bordered sulcus.

talus of cliffs along NE side of Mount Ayanganna, elev. below 762 m., *Tillett, Boyan, & Tillett 45024* (NY, US). Suriname. Tafelberg: vicinity Base Camp, Tafelberg Creek, *Maguire 24098* (NY, 2 sheets, U); infrequent in high mixed forest, rocky slopes, Arrowhead Basin, 625 m., *Maguire 24611* (NY, 2 sheets, U); in savanna forest between Tafelberg and source of Saramacca River, on Roraima sand, *Wessels Boer 1540* (A, NY, U).

3. *Tachia occidentalis* Maguire & Weaver, sp. nov. TYPE: Colombia. Vaupés: Río Apaporis, Cachivera de Jirijimo y alrededores, ca. 250 m., *Schultes & Cabrera 12476* (holotype, GH). FIGURES 1, A-H; 6.

Frutex vel arbor parva perennis subherbacea saepe basi lignosa; caulibus ad 8 m. altis quadrangularibus vel subteretibus; foliis oppositis laminibus tenuiter membranaceis indistincte pinnivenatis ellipticis vel oblongo-ellipticis abrupte vel graduate ad basim contractis 7-20 cm. longis 2.7-7.7 cm. latis, petiolis 6-17 mm. longis; flore solitario axillari; calyce 14-25 mm. longo petiolis excedentibus anguste 5-alato, lobis ca. 1/3 longitudine tubi; corollis tubulari-infundibuliformibus 6.4-7.7 cm. longis viridibus vel luteo-viridibus aliquantum arcuatis, lobis patentibus vel reflexis oblongo-ovatis abrupte brevi-acuminatis vel apiculatis erosulatis 10-15 mm. longis 5-8 mm. latis; staminibus 5, filamentis circa basin tubi affixis 4.0-4.7 mm. longis tubo vix exserto, antheris anguste oblongis ca. 5 mm. longis; pollinibus subsphaeroideis 3-colporatis ca. 40 μ m. diametro sporodermate laevi sparse minute globulifero; stylis aliquantum exsertis, lobis stigmatum ca. 3 mm. longis suborbicularibus; capsulis non vidis.

REPRESENTATIVE SPECIMENS. Colombia. Amazonas: trocha entre El Encano y La Chorrera, ca. 180 m., *Schultes 3876* (F, GH, US); Río Popeyacá (tributary of Apaporis between Río Piraparaná and Raudal Yayacopi), near mouth, ca. 700 ft., *Schultes & Cabrera 15571* (US). Vaupés: Raudal de Jirijimo, Río Apaporis, *Schultes & Cabrera 14670* (GH); Río Apaporis, entre los ríos Kananarí y Pacoa, 250 m., *García-Barriga 13932* (NY, US); Río Apaporis, Soratama, *Schultes & Cabrera 16144* (US); Macu-Parana, *Allen 3084* (MO); headwaters of Caño Teemeeña, Lobo Igarapé, *Schultes & Cabrera 17334* (US). Brazil. Amazonas: São Paulo de Olivença, *Ducke 1115* (MO, NY, US); Macubeta on Rio Marié, *Fróes* (Krukoff) *12439/183* (A, NY); Rio Negro, Taracúa, *Rodrigues & Pires 141* (US); Rio Negro, Ilha das flores, foz do Rio Uapés, *Pires 394* (NY); Tonantins, *Ducke 22389* (US). Brasiliae borealis: prope San Gabriel da Cachoeira, *R. Spruce 2190* (F). Peru. Huanuco: southwest slope of the Río Lullapichis watershed, on the ascent of Cerros del Sira, ca. 860 m., *Wolfe 12229* (F); Agua Blanca (Camino a Monzón), 700-800 m., *Schunke-Vigo 1047* (NY). Junín: Pichis Trail, Santa Rosa, 625-690 m., *Killip & Smith 26163* (F, NY, US). Loreto: Aguaytia, 300 m., *Woytkowski 5348* (F, MO); Santa Ana on the Upper Río Nanay, *Williams 1243* (F); Florida, Río Putumayo, at mouth of Río Zubineta, 180 m., *Klug 2123* (A, F, GH, MO, NY, US).

The most widespread and most frequently collected of the species, *Tachia occidentalis* has for the most part passed as *T. guianensis*. It differs from that species, however, in its shorter, narrowly alate calyx, and its pollen

grains that are characterized by having a smooth rather than a reticulate exine.

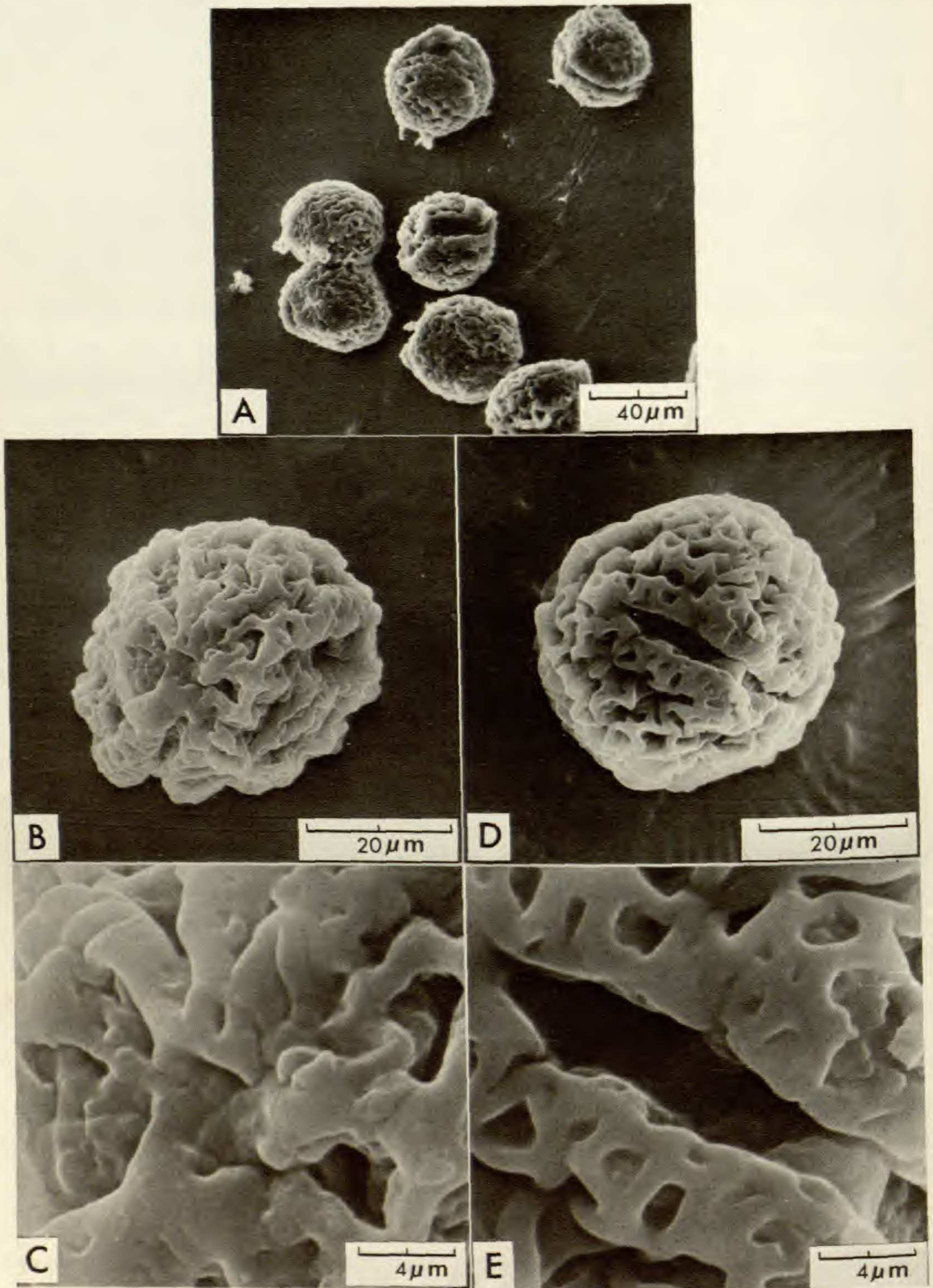


FIGURE 7. *Tachia lorentensis*, Klug 1563. SEM micrographs. Pollen grains sphaeroidal, 3-colporate, exine reticulate-corrugate. A, general field, $\times 500$; B, polar view, $\times 1500$; C, portion of polar view showing corrugate sculpture, $\times 5000$; D, equatorial view, $\times 1500$; E, portion of pore and sulcus, $\times 5000$.

4. *Tachia smithii* Maguire & Weaver, sp. nov. TYPE: Brazil. Pará: in dense forest on southern slopes of the Akarai Mountains, in drainage of Rio Mapuera (Trombetas tributary), 500–700 m., A. C. Smith 2931 (holotype, NY; isotypes, A, F, MO, US).

Frutex simplex ad 4 m. altus; foliis oppositis, laminibus tenuiter membranaceis ellipticis caudatis cuneato-attenuatis 10.0–17.2 cm. longis 4–8 cm. latis, venis lateralibus inconspicuis cum costa angulo 90° formantibus, petiolo 1–2 cm. longo; flore vulgo solitario axillari; calyce 1.8–2.5 cm. longo ecarinato, lobis oblongis obtusis vel acutiusculis longitudinaliter tubo aequalibus; corollis albis infundibuliformibus 6.5–7.3 cm. longis, lobis recurvatis ovatis abrupte acuminatis erosulatis ca. 15 mm. longis 8–11 mm. latis; staminibus 5, filamentis 3.9–4.5 cm. longis infra medium tubi affixis, filamentis circa apices recurvis, antheris sagittatis ca. 3 mm. longis introrsis; stylo 5.0–5.2 cm. longo, lobis stigmatum ovatis vel ellipticis, 4–6 mm. longis; capsulis non visis.

DISTRIBUTION. Known only from the type locality, this plant is similar to *Tachia guianensis*, with which it may be sympatric. It differs from that species, however, in its generally shorter calyx, its white corolla, its plane corolla lobes, and its conspicuously recurved or hooklike filaments.

5. *Tachia loretensis* Maguire & Weaver, sp. nov. TYPE: Peru. Loreto: in dense forest, ca. 100 m. alt., Mishuyacu, near Iquitos, Klug & Smith 29925 (holotype, US; isotypes, F, NY). FIGURE 7.

Frutex ad 1 m. altus; ramis subteretibus; foliis oppositis, laminis tenui-membranaceis ellipticis brevi-caudatis cuneato-attenuatis 10.0–16.5 cm. longis 3.0–6.5 cm. latis, venis lateralibus inconspicuis pinnatis, formantibus angulo acuto cum costa versus apicem recurvatis, petiolis 1.0–2.5 cm. longis; calyce 1.4–2.0 cm. longis minus $1/2$ longitudine corollae lobis et tubo longitudine aequalibus ecarinatis, lobis oblongis, obtusis vel rotundatis erosulatis; corollis albis 5–5.9 cm. longis late tubuliformibus, tubo infra cylindricum supra expansum, lobis late ovatis vel oblongo-ovatis abrupte acuminatis erosulatis 10–13 mm. longis 5–8 mm. latis; staminibus 5 aliquantum exsertis, filamentis 1.6–2.3 cm. longis medio tubi affixis; granis pollinis sphaeroideis ca. 40 μ m. diametro sporodermate reticulato; lobis stigmatum spathulatis; capsulis maturis ca. 13 mm. longis.

DISTRIBUTION. Known only from the vicinity of Iquitos, Peru.

SPECIMENS EXAMINED. Peru. Loreto: forest, Klug 1277 (NY, US); forest near Iquitos, 100 m. alt., Klug 1563 (F, US).

6. *Tachia grandiflora* Maguire & Weaver, sp. nov. TYPE: Brazil. Amazonas: Serra da Lua, Río Urubu, between Cachoeira Iracema and Natal, Prance et al. 5042 (holotype, F; isotypes, GH, INPA, NY, US).

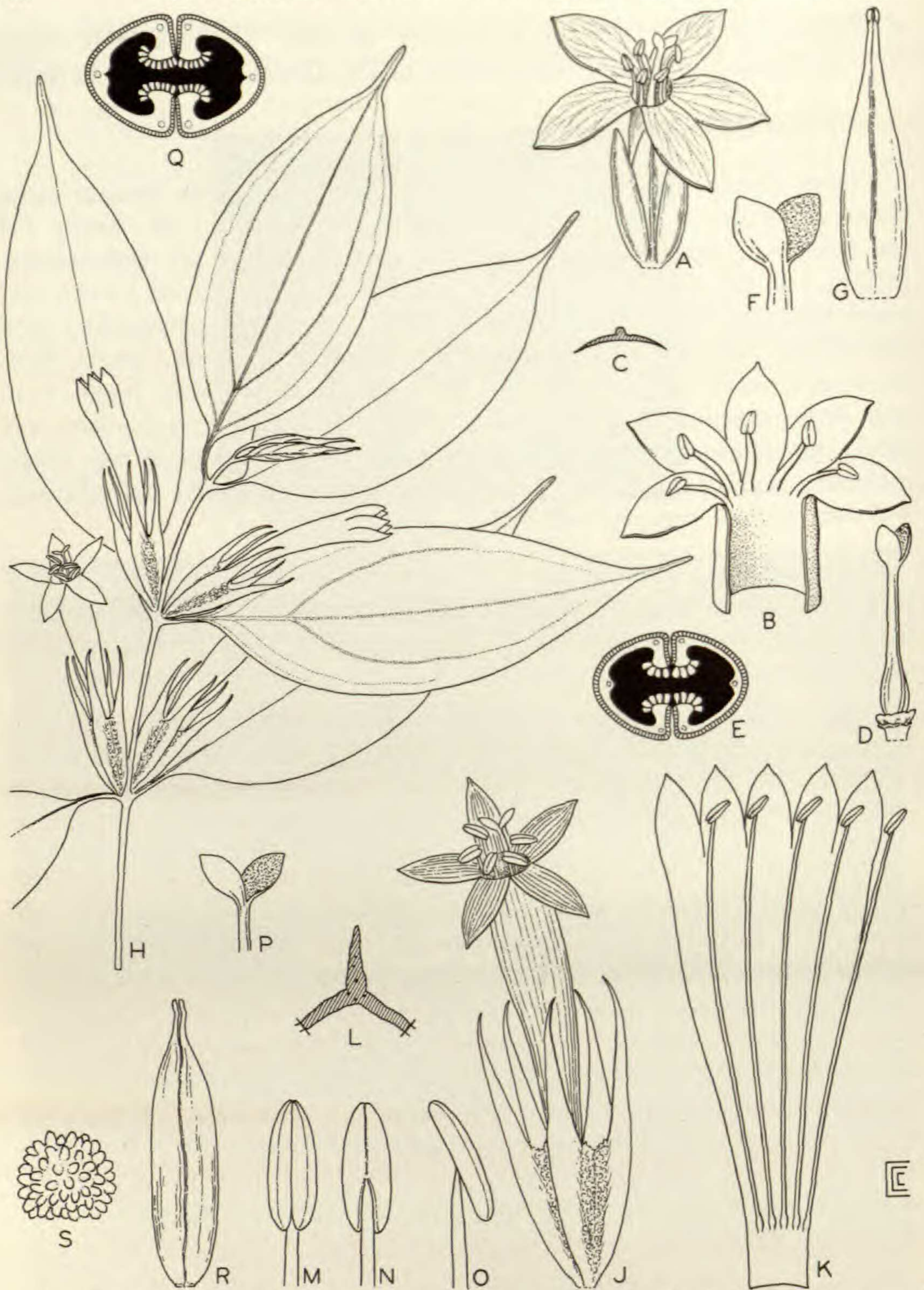


FIGURE 8. A-G, *Tachia parviflora*, Buchtien 1431. A, flower, $\times 2$; B, opened corolla, $\times 2$; C, sepal, cross-section diagram, $\times 3$; D, ovary, style, and stigma, $\times 4$; E, ovary, cross-section diagram; F, stigma, $\times 4$; G, capsule, $\times 2$. H-S, *Tachia schomburgkiana*. H, habit, Maguire, Steyermark, & Maguire 46914 and Tillett & Tillett 45447, $\times 1/2$; J, flower, Pinkus 3, $\times 1$; K, opened flower, Pinkus 227, $\times 1$; L, sepal, cross-section diagram, Maguire 46794, $\times 3$; M, anther, ventral view, Pinkus 3, $\times 4$; N, anther, dorsal view, Pinkus 3, $\times 4$; O, anther, lateral view, Pinkus 3, $\times 4$; P, stigma, Tillett & Tillett 45447, $\times 2$; Q, ovary, cross-section diagram, Maguire, Steyermark, & Maguire 46780; R, capsule, Pinkus 3, $\times 2$; S, seed, Pinkus 3, $\times 20$.

Frutex cum ramis scandentibus; ramis subteretibus vel angulosis obscuris; foliis oppositis, laminis tenui-membranaceis ellipticis caudatis cuneato-attenuatis 9.5–15.5 cm. longis 4.0–6.6 cm. latis, petiolis 9–14 mm. longis; calyce exalato, 21–22 mm. longo tubo et lobis plus minusve aequalibus, lobis obtusis vel acutiusculis erosulatis; corollis tubuliformibus aliquantum late, tubo infra expansum 7.0–7.7 cm. longo, lobis imbricatis ovatis abrupte acuminatis ca. 16 mm. longis 11–12 mm. latis; stylis et antheris aliquantum exsertis, antheris ca. 4 mm. longis; lobis stigmatum suborbicularibus ca. 3 mm. longis.

DISTRIBUTION. Known only from two collections, the type and the following: **Brazil.** Pará: sousbois de la forêt, Jurupá, *Ducke 16168* (US).

7. *Tachia schomburgkiana* Benth, Jour. Bot. Kew Misc. 2: 204. 1854. TYPE: **Guyana.** On the mountains covered with thick forest between Roraima and the Cuyuni, at an elevation of 3000–4000 ft., *Richard Schomburgk 1546* (holotype, K, not seen).

FIGURES 8, H–S; 10; 11; 12.

Shrubs to 2 m. tall, branches quadrangular; leaves thin-membranaceous, distinctly 5-nerved, the upper lateral pair closely paralleling the midvein into the apex, elliptic to ovate or ovate-lanceolate, caudate, \pm abruptly constricted to the petiole and the base therefore rounded, 8.8–17.0 cm. long and 4.0–8.5 cm. broad, the petiole winged to the base, 1.0–1.5 cm. long; calyx yellowish, 2.6–4.0 cm. long, 1/2 to nearly 3/4 as long as the corolla tube, much exceeding the petioles, the tube strongly 5-alate and the lobes formed by an extension of the 3 mm. broad wings, the lobes long acuminate, 1.1–2.8 cm. long, as long as to nearly half again longer than the tube, auriculate at the base (this probably representing the juncture of the lobes proper with the greatly extended wing), the auricles erosulate; corolla yellow or yellow-green, tubular-funnelform, 6.5–7.4 cm. long, the tube constricted in the lower half, then expanding and cylindrical or widening slightly to the apex, the lobes oblong-lanceolate, abruptly short-acuminate, erosulate, apparently recurved, 11–14 mm. long and 5–6 mm. broad, ca. 1/6 the total length of the corolla; stamens 5, the filaments inserted near the base of the corolla tube, below the apex of the calyx tube; filaments well surpassing the corolla tube, 4.2–5.2 cm. long, the anthers oblong, obtuse, 3–4 mm. long; pollen grains sphaeroidal, ca. 40 μ m. in diameter, the exine reticulate; style equaling the corolla lobes, 5.0–5.5 cm. long; lobes of the stigma ovate; capsule including the beak 2–2.5 cm. long, the apex barely protruding from the persistent calyx; seeds strongly papillose.

SPECIMENS EXAMINED. **Venezuela.** Bolívar: frequent in montane woodland, 400 m. alt., La Escalera, Río Uiri-yuk, Alto Río Cuyuni, *Maguire, Steyermark, & Maguire 46780* (NY, VEN); occasional in mixed montane forest below La Escalera, 600–800 m., Río Uiri-yuk, Alto Río Cuyuni, *Maguire, Steyermark, & Maguire 46914* (NY, VEN); km. 119 south of El Dorado, 1030 m. alt., *Steyer-*

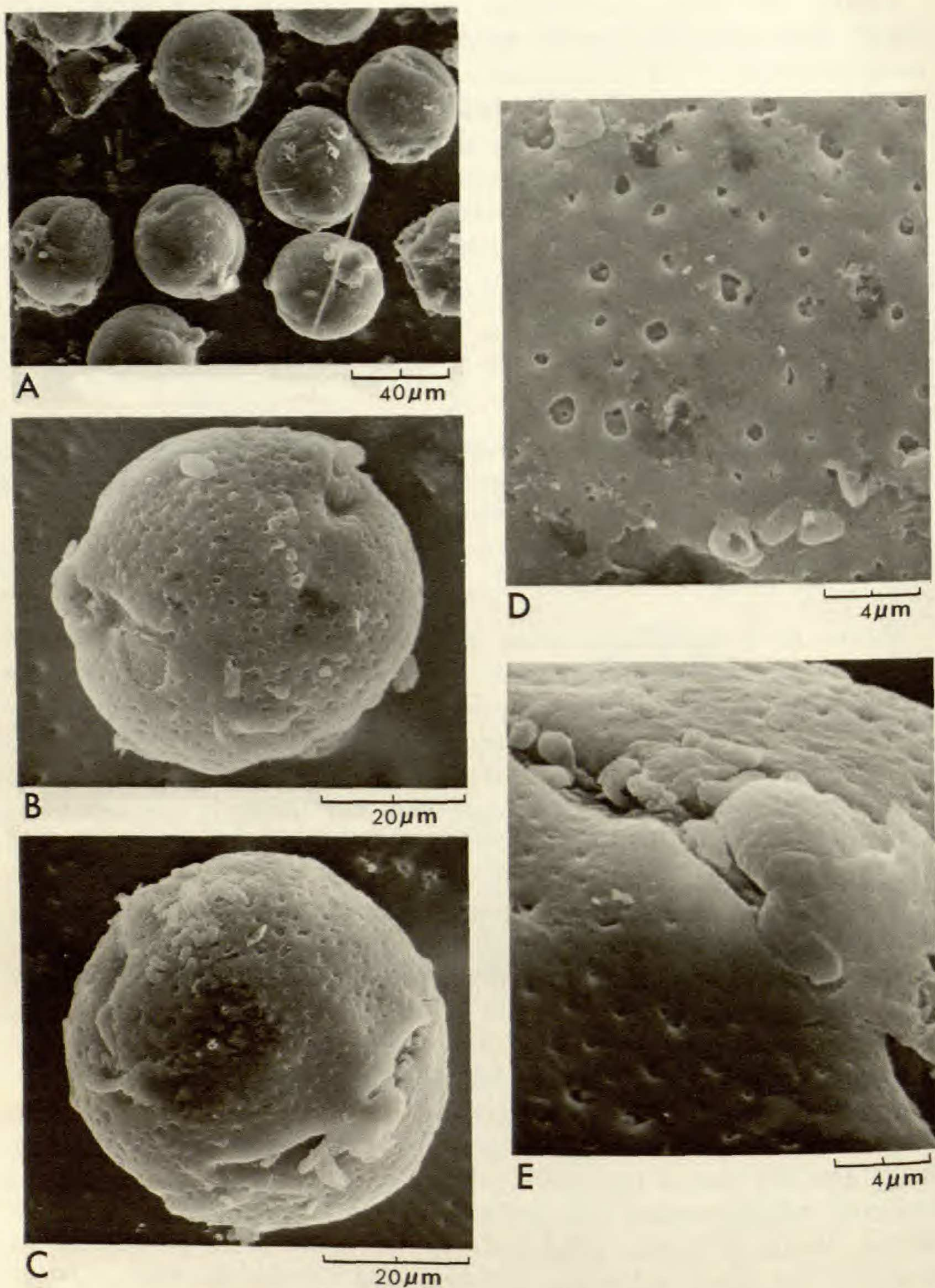


FIGURE 9. *Tachia parviflora*, *Dudley 13072*. SEM micrographs. Pollen grains sphaeroidal, 3-colporate, exine puncti-laevate. A, general field, $\times 500$; B, polar view, $\times 1500$; C, oblique equatorial view, $\times 1500$; D, pitted exine, note irregular puncti or perforations, $\times 5000$; E, portion of spore and sulcus, $\times 5000$.

mark, *Dunsterville*, & *Dunsterville 93044* (NY, US, VEN). Guyana: Kamakusa, upper Mazaruni River, *Leng 331* (NY); Makreba Falls, Kurupung River, *Altson 355* (NY, 2 sheets); near Makreba Falls, Kurupung River, rocky soil on hillside,

Pinkus 3 (NY, US); Membaru Creek, upper Mazaruni River, *Pinkus* 227 (NY, US); frequent in *Cunuria* forest, 1000 m. elev., *Maguire & Fanshawe* 32345 (NY, 2 sheets, US); in mixed evergreen forest, along line to E end of Karowtipu, 500 m. alt., Kako River, *Tillett & Tillett* 45447 (NY).

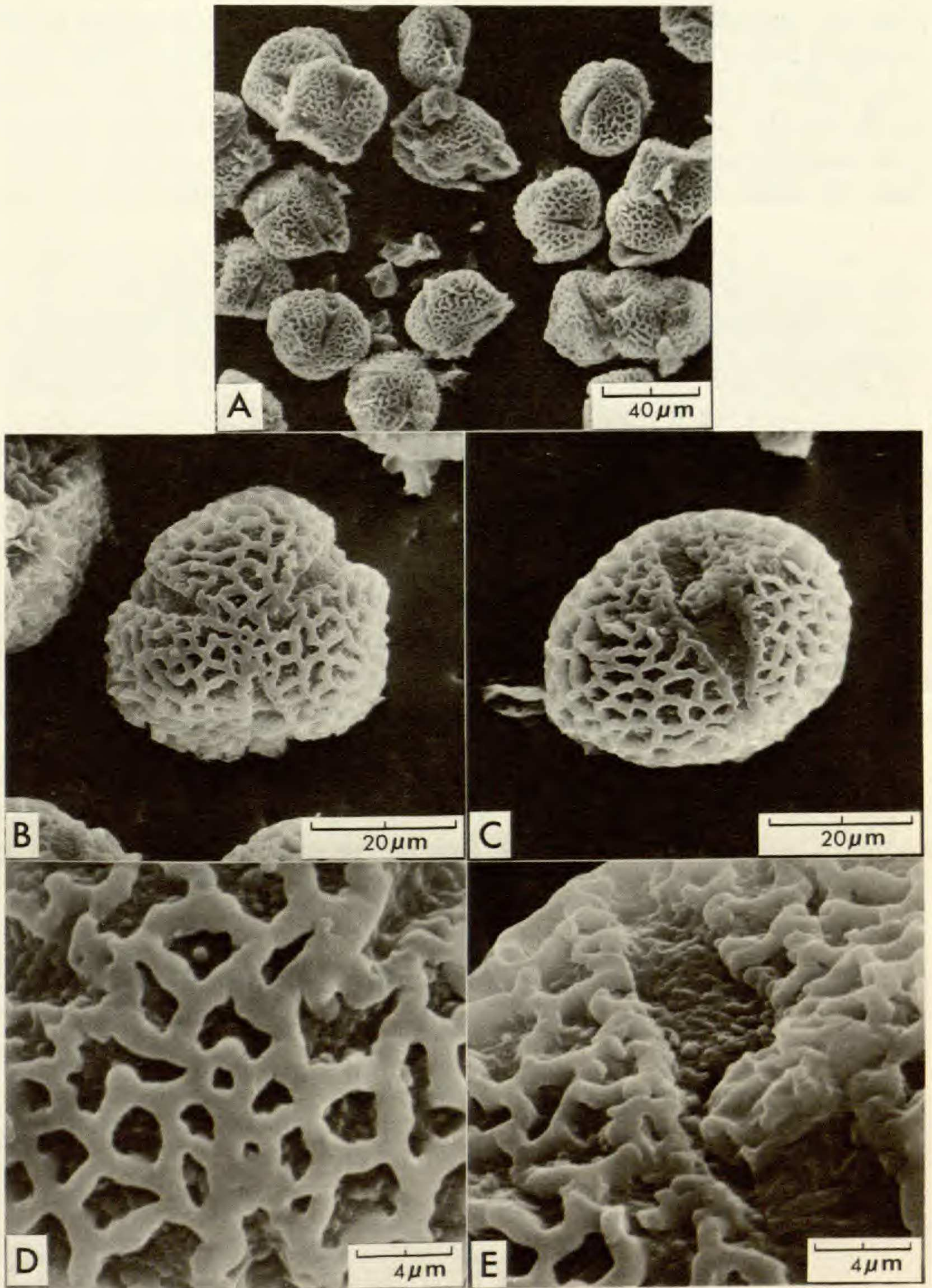


FIGURE 10. *Tachia schomburgkiana*, *Tillett & Tillett* 45447. SEM micrographs. Pollen grains sphaeroidal, 3-colporate, strongly reticulate. A, general field, $\times 500$; B, polar view, $\times 1500$; C, equatorial view, $\times 1500$; D, reticulum, $\times 5000$; E, portion of pore and sulcus, $\times 5000$.

8. *Tachia gracilis* Benth, Jour. Bot. Kew Misc. 6: 203. 1854. TYPE: Guyana (Brazil?): "Serra Mey," *Schomburgk 145.S* (holotype, K; photograph, NY).

A shrub reputedly to 3 m. tall; leaves thin-membranaceous, distinctly 5-nerved, narrowly ovate to elliptic, caudate, abruptly constricted to the petiole, 5.5–10.5 cm. long and 2–4.3 cm. broad, the petiole 6–17 mm. long; calyx yellow, 14–20 mm. long, longer than the petiole, $2/5-1/2$ as long as the corolla tube, weakly carinate, divided halfway to the base into oblong, acutish lobes; corolla tubular or tubular-funnelform, yellow, 5–6 cm. long, the lobes recurved, oblong-lanceolate, abruptly acuminate, 9–11 mm.

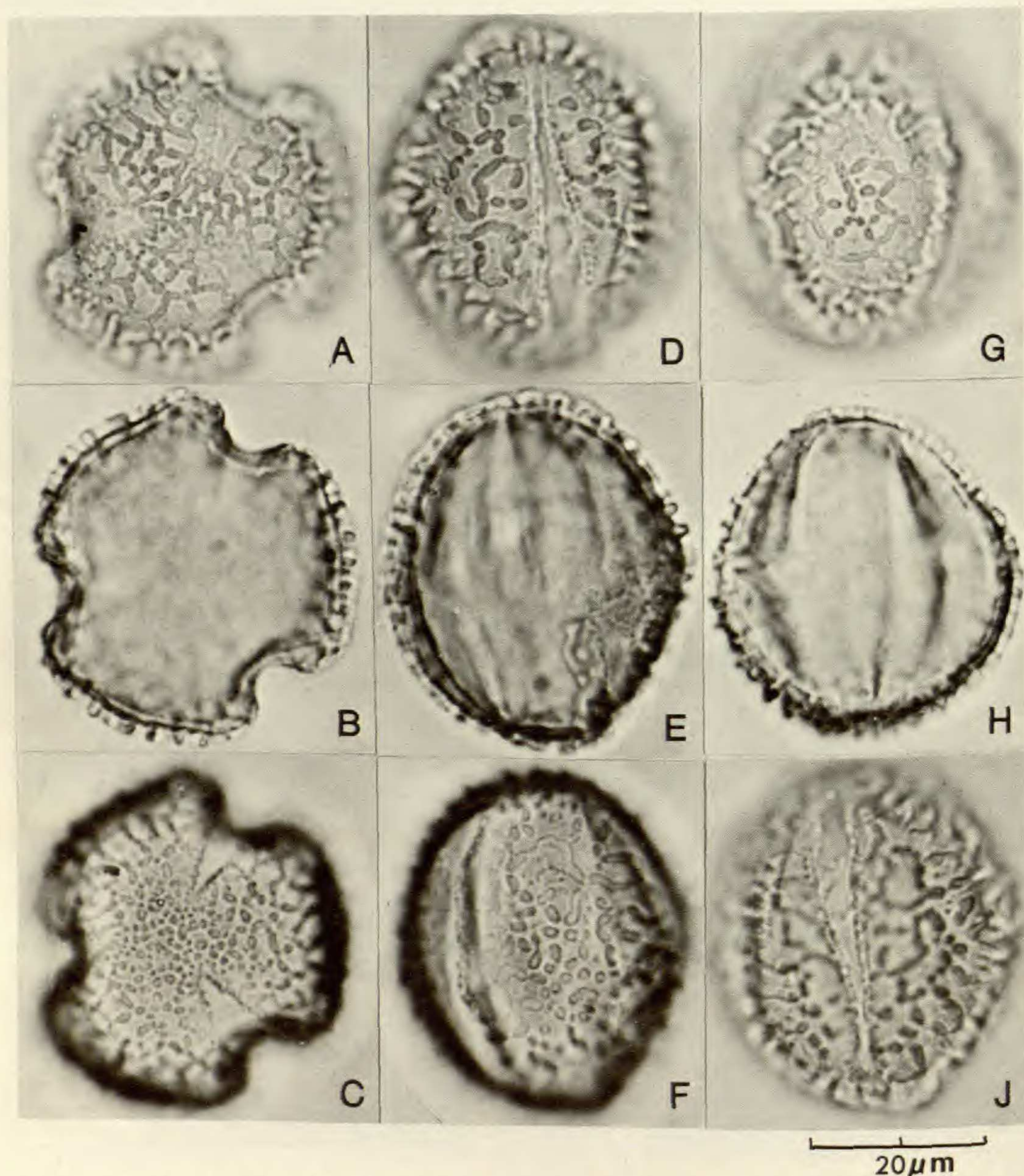


FIGURE 11. *Tachia schomburgkiana*, *Tillett & Tillett 45447*. Light microscope micrographs, $\times 1500$. A–C, polar views at successive focal levels; D–F, equatorial views at successive focal levels, sulcus uppermost; G–J, equatorial views at successive focal levels, intersulci area uppermost.

long and 5–6 mm. broad, ca. 1/5 the total length of the corolla; filaments inserted near the base of the corolla tube, 3.5–4.5 cm. long, well surpassing the corolla tube; anthers oblong, obtuse, ca. 3 mm. long; style 3.7–4.8 cm. long; stigma lobes ovate; capsule ca. 2 cm. long.

SPECIMENS EXAMINED. Venezuela. Territorio Amazonas: Cerro Marahuaca, 1000 m., *Maguire & Maguire, Jr.* 29207 (NY); Sierra Parima, frontera #8, 1300 m., *Steyermark, Pantchenko, & Dilarmando Mendes* 107570-A (A); Sierra Parima, a lo largo de la frontera Venezolana-Brasilera, a unos 45 km. al Noroeste des las cabeceras del Río Orinoco, 1300 m., *Steyermark* 106081 (VEN); Cerro Duida, a lo largo del Orinoco, 1000 m., *Fariñas, Velasquez, & Medina* 391 (VEN).

The Schomburgk collection, upon which this name rests, was cited from British Guiana without a collector's number. However, the original ticket bears the number "145.S," the "S" indicating that the collection was represented by a single specimen only. Reference to the lists of Schomburgk collections, deposited at Kew in the Bentham files, shows the number "145.S" to occur in a list of unicate collections without regard to chronology or geography. "Serra Mey," the cited locality, as suggested by the Portuguese geographic name, is probably in Brazil and probably in the Rio Uraricuera (Araricuara), the Alto Río Orinoco or Rio Negro area. A similar disposition has been made for the range designation of *Sipapoa vestita* (Benth.) Maguire of the Malpighiaceae.

9. *Tachia parviflora* Maguire & Weaver, sp. nov. **TYPE:** Colombia. Caquetá: Bosques entre 1000 y 1300 m. alt., vertiente oriental, Sucre, Cordillera Oriental, *Cuatrecasas* 9059 (holotype, F; isotype, US).

FIGURES 8, A–G; 9.

?*T. pavonii* Gilg in Engler & Prantl, Nat. Pflanzenfam. 4(2): 93. 1895 (*nomen nudum*).

Frutex vel arbor parva, ad 6 m. alta, aliquantum scandens; ramis subteretibus; foliis oppositis, laminis tenui-membranaceis 5-nervatis jugo primario interdum indistincto, petiolis 1.0–2.5 cm. longis; floribus frequenter pluribus; calyce 1.0–1.5 cm. longo, tubo brevissimo, lobis ad 1.4 mm. longis ecarinatis lanceolatis obtusis vel acutiusculis scario-marginatis erosulatis; corollis chloritici-albis brevi-hypocrateriformibus 1.4–2.4 cm. longis tubo vix calyce longiore, lobis oblongis abrupte brevi-acuminatis erosulatis ad apicem reflexis 6–9 mm. longis 3–5 mm. latis; staminibus 5, exsertis, filamentis subulatis ad summum tubi affixis ad basim expansis, antheris oblongis ca. 2 mm. longis; granis pollinis sphaeroideis, ca. 40 μ m. diametro non reticulatis laevibus minute punctatis; stylis brevibus ca. 8 mm. longis, lobis stigmatum obovatis; capsulis immaturis longioribus calyce rostro prominente.

DISTRIBUTION. Rather widely distributed at median altitudes from Colombia to Bolivia.

SPECIMENS EXAMINED. Peru. Huanuco: SW slopes of Río Lullapichis watershed, on ascent of Cerros del Sira, ca. 1400 m. alt., *Dudley 13072* (F); SW

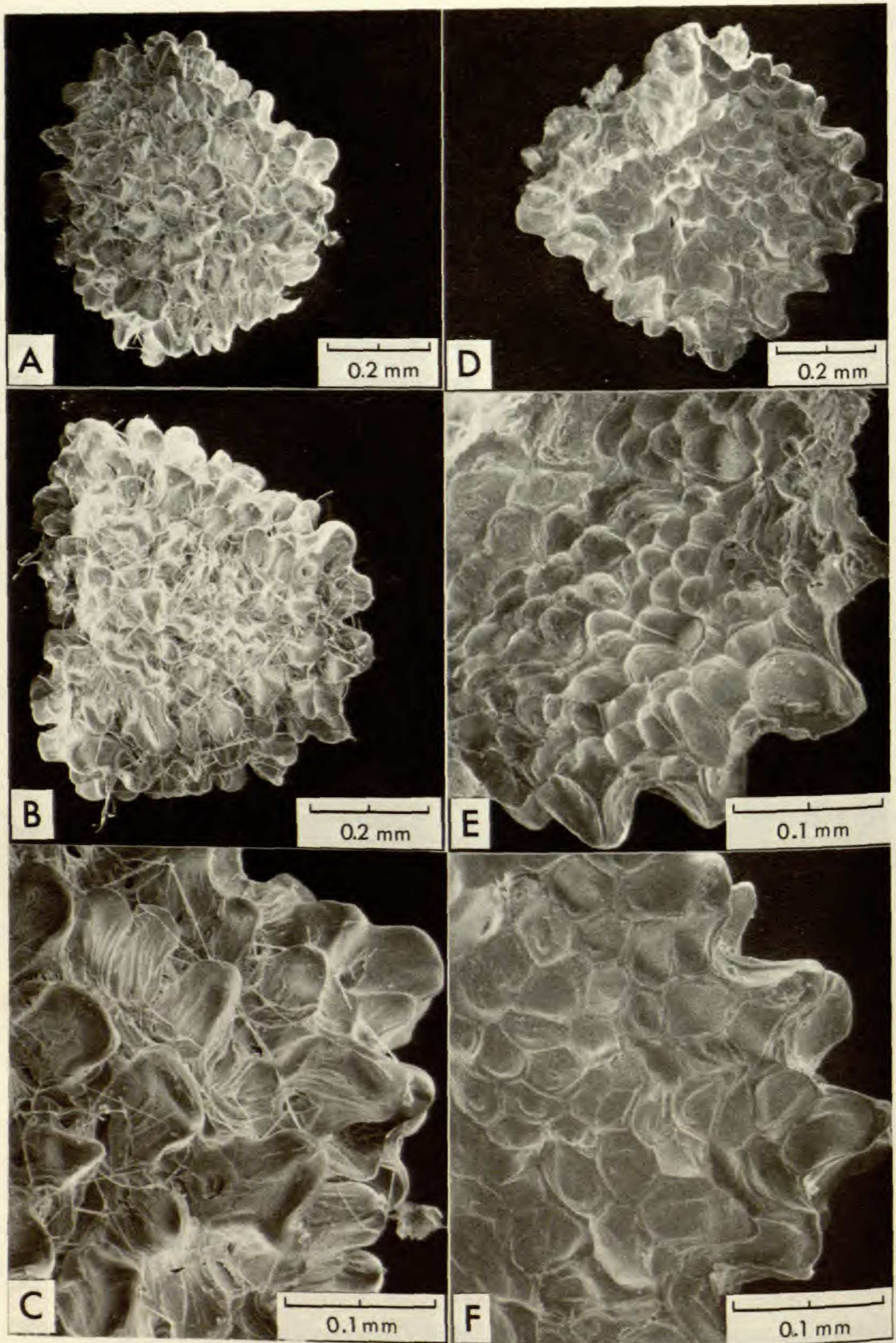


FIGURE 12. *Tachia schomburgkiana*. SEM micrographs. Seed strongly papillose. A-C, *Pinkus 3*. A, $\times 100$; B, $\times 120$; C, $\times 300$. D-F, *Maguire 46794*. D, $\times 100$; E and F, $\times 300$.

slope of Río Llullapichis watershed, on ascent of Cerros del Sira, 860 m., *Wolfe* 12228 (F), 12249 (F). **Bolivia.** Larecaja: Mapiri Region, San Carlos, 850 m., *Buchtien* 1431 (F, NY, US); Dept. of La Paz, Copacabana (ca. 10 km. south of Mapiri), 850–950 m. alt., *Krukoff* 11004, 11091 (A, F, MO, NY, US).

This species is unique in the genus because of its small flowers with salverform corollas. Therefore, it is possibly the species which Gilg (1895) had in mind when he mentioned "*T. Pavonii* Gilg, mit ziemlich kleinen Bl. (üten)." The name "*T. Pavonii*," being a *nomen nudum*, is illegitimate, however.

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B. M.

THE NEW YORK BOTANICAL GARDEN
BRONX, NEW YORK 10458

R. E. W., JR.

ARNOLD ARBORETUM
HARVARD UNIVERSITY
JAMAICA PLAIN
MASSACHUSETTS 02130